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The Department of Defense (DOD) needs to tighten its controls over the allowability on Government contracts of certain technical costs incurred by aircraft manufacturers. Four manufacturers of aircraft or engines were investigated to determine whether the Government was paying more than its appropriate share of such costs. Findings/Conclusions: Some contractors are using independent research and development (IR&D) funds for questionable purposes. Technical work known as production support to bring products in use up to specifications has been charged to IR&D. GAO believes such costs should be paid by the company. Because of the difficulty in obtaining records and the questionable adequacy of records provided by the contractors, DOD will have to modify its planned questionnaire to allow Government access to commercial records to verify the certified data and obtain other data not covered in the questionnaire. Recommendations: DOD should monitor the revision of the Armed Services Procurement Regulation (ASPR) to ensure that contractors and Government employees have a clear definition of IR&D that excludes commercial product support, and technical work implicitly required to fulfill a purchaser's contract requirement. The questionnaire project should be monitored to ensure that Government reviewers will be able to verify the allowability of costs. Otherwise, the ASPR should require that advance IR&D agreements permit Government review of commercial records. Contractors should be required to keep records in enough detail to allow evaluators to determine whether IR&D charges are allowable. (DJM)

REPORT TO THE CONGRESS

BY THE COMPTROLLER GENERAL OF THE UNITED STATES

Need To Prevent Department Of Defense From Paying Some Costs For Aircraft Engines That Contractors Should Pay

Two aircraft engine manufacturers have charged some costs of commercial engines to their independent research and development programs. GAO believes these charges are inappropriate. Some of these costs were then allocated to Department of Defense contracts.

Defense should

--clarify its instructions so that support of commercial products will not be allowed as independent research and development, and

--obtain access to contractors' commercial records to determine if charges to independent research and development are allowable.

PSAD-77-57

FEB. 28, 1977

COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

B-164912

To the President of the Senate and the
Speaker of the House of Representatives

This report describes the need for the Department of Defense to tighten its controls over the allowability on Government contracts of certain technical costs incurred by aircraft engine manufacturers. We undertook this review to determine whether the Government was paying more than its appropriate share of such costs.

Our review was conducted under the authority of the Budget and Accounting Act, 1921 (31 U.S.C. 53), the Accounting and Auditing Act of 1950 (31 U.S.C. 67), and the Comptroller General to examine contractors' records, as set forth in 10 U.S.C. 2313(b).

Copies of this report are being sent to the Director, Office of Management and Budget; and the Secretary of Defense.

ACTING Comptroller General
of the United States

COMPTROLLER GENERAL'S
REPORT TO THE CONGRESS

NEED TO PREVENT DEPARTMENT OF DEFENSE FROM PAYING SOME COSTS FOR AIRCRAFT ENGINES THAT CONTRACTORS SHOULD PAY

D I G E S T

Because some contractors are using independent research and development funds for what GAO believes are questionable purposes, the Congress should review the Secretary of Defense's efforts to

--narrow the Armed Services Procurement Regulation definition of "independent research and development" and

--obtain contractors' commercial records, so that Government evaluators can determine whether costs should be paid from independent research and development funds.

If the Secretary cannot accomplish these reforms administratively, legislative action by the Congress may be necessary. (See p. 23.)

Independent research and development is that part of a contractor's total research and development program not required by contract or grant, including

--basic and applied research to increase scientific knowledge;

--development, using technical knowledge to design, develop, test, and evaluate a potential product or service (or improve an existing one); and

--studying systems and ideas.

The contractor decides what technical work to do. The Department of Defense considers expenditures for this work to be a legitimate business cost which should be supported by both the contractor's Government and commercial business. (See p. 1.)

COMMERCIAL PRODUCTION SUPPORT CHARGED TO INDEPENDENT RESEARCH AND DEVELOPMENT

Contractors also do technical work known as product support to bring products already in use up to existing specifications and to solve any problems with them. Product support is not defined by the Armed Services Procurement Regulation. (See p. 2.)

In GAO's opinion, the costs of commercial product support should be paid with company funds. (See p. 3.) The Boeing Commercial Airplane Company and the Douglas Aircraft Company finance such costs. (See p. 5.)

However, Pratt & Whitney Aircraft Division and General Electric Aircraft Engine Group have charged some product support costs of commercial aircraft engines to independent research and development (see pp. 5 to 13), causing some costs to be allocated to Government contracts. Although the contractors do not agree, GAO believes that such allocations are inappropriate. Because the Department of Defense pays directly for large amounts of product support for military engines (see p. 3), it should not also pay for a portion of commercial product support. (See p. 12.)

Pratt & Whitney and General Electric Aircraft Engine Group account for about 80 percent of the annual military engine sales. (See p. 2.)

Pratt & Whitney's stated policy is that product support for an engine certified by the Federal Aviation Administration is funded under a company-sponsored program, not under independent research and development. (See p. 5.) Pratt & Whitney did not follow its policy. Some charges to independent research and development related directly to engines in commercial service and not to engines still being developed. (See p. 5.)

General Electric Aircraft Engine Group's position is that all engine development and improvement costs, except those associated with Federal Aviation Administration certification and those specified in a contract, can be

considered independent research and development. (See pp. 5 and 10.)

GAO could not determine how much commercial product support Pratt & Whitney and General Electric Aircraft Engine Group considered independent research and development, because the records GAO was permitted to review were inadequate. The companies' documentation generally defined broad areas of technical work without stating why the work was being done. Pratt & Whitney would not furnish specific documents referred to in its independent research and development work authorizations. (See p. 19.)

Because of previous difficulties in obtaining records, GAO recommended in December 1974 that the Armed Services Procurement Regulation require that advance agreements with contractors on independent research and development give enough access to contractors' commercial records for the Defense Department to determine whether the charges were allowable. (See p. 20.)

In response to GAO's finding of the continued need for authority to review contractors' records, Defense said that it is working on a project to eliminate the need for access to commercial records. A questionnaire will be developed requiring contractors to provide specific, certified data, which would establish allowability of costs and be the basis for legal action in case of misrepresentation. (See p. 22.)

To be effective, GAO believes this approach will have to provide for Government access to contractors' commercial records to verify the certified data and obtain any other pertinent data not covered in the questionnaire. (See p. 22.)

AGENCY COMMENTS

The Department of Defense agreed that its procurement regulation should be revised to include appropriate definitions of "product support" and "product improvement" and said it would develop them. The Department did

not comment on whether the technical work required for solving commercial operating problems of inservice commercial engines is allowable as an independent research and development expense. (See p. 13.)

Defense also said that its revised definition of independent research and development will preclude having to amend its procurement regulation to specifically exclude any technical work implicitly required to fulfill a purchaser's requirements under terms of a contract. (See p. 15.)

RECOMMENDATIONS

To improve the administration of the independent research and development program, the Secretary of Defense should:

--Monitor the Armed Services Procurement Regulation revision to make sure that the results provide contractors and Government employees with a clear definition of independent research and development that will specifically exclude (1) commercial product support and (2) technical work implicitly required to fulfill a purchaser's requirement under terms of a contract. (See p. 17.)

--Monitor the progress of the questionnaire project to make sure that it will provide Government reviewers with the means of verifying the allowability of cost. Otherwise, the Armed Services Procurement Regulation should be revised to require that advance independent research and development agreements specifically authorize the Government to review commercial records in order to determine the allowability of costs.

--Require contractors to maintain records in enough detail to enable Government evaluators to determine whether independent research and development charges are allowable (See p. 23.)

Contents

ABBREVIATIONS

AEG	Aircraft Engine Group
ASPR	Armed Services Procurement Regulation
DOD	Department of Defense
EAPS	engineering assistance to production and service
FAA	Federal Aviation Administration
GAO	General Accounting Office
IR&D	independent research and development

CHAPTER 1

INTRODUCTION

INDEPENDENT RESEARCH AND DEVELOPMENT

The term "independent research and development" (IR&D) is used by Government agencies to distinguish the independent work of a contractor from research and development performed under contract or grant arrangement.

The Armed Services Procurement Regulation (ASPR) defines IR&D as a contractor's technical effort not sponsored by, or required in performance of, a contract or grant. IR&D includes (1) basic and applied research, (2) development, and (3) systems and other concept formulation studies.

Basic and applied research are directed toward increasing scientific knowledge and advancing the state-of-the-art. Development uses available technical knowledge to design, develop, test, and evaluate a potential product or service (or improve an existing one) to meet specific performance requirements or objectives.

The Department of Defense (DOD) considers contractors' IR&D expenditures as legitimate costs of doing business and believes that its support of IR&D encourages industry to provide new concepts and rapid responses to defense needs. DOD recognizes IR&D costs as indirect costs to be allocated to a contractor's Government and commercial business, usually as general and administrative expenses.

During an earlier review 1/, we noted that the Pratt & Whitney Aircraft Division of the United Technologies Corporation (formerly United Aircraft Corporation) might be including in its IR&D program technical effort to solve operational problems of inservice commercial aircraft engines. Such effort is called "product support".

We undertook a second review to determine whether it is proper for such effort to be done as IR&D and whether Government procedures and controls are adequate.

1/"Independent Research and Development Allocations Should Not Absorb Costs of Commercial Development Work," Department of Defense (PSAD-75-5, Dec. 10, 1974).

SCOPE OF REVIEW

Our review was conducted at four contractor locations--the two aircraft engine manufacturers that account for about 80 percent of the annual military engine sales, and two aircraft manufacturers.

Contractor	Product
Boeing Commercial Airplane Company The Boeing Company Renton, Wash.	Aircraft
Douglas Aircraft Company McDonnell Douglas Corporation Long Beach, Calif.	Aircraft
General Electric Company Aircraft Engine Group (AEG) Evendale, Ohio	Aircraft engines
Pratt & Whitney Aircraft Division United Technologies Corporation East Hartford, Conn.	Aircraft engines

We analyzed and evaluated contractors' documents for IR&D to the extent allowed by availability of documentation and contractor cooperation. We also examined records and reports of DOD plant representatives, the Defense Contract Audit Agency, and the Federal Aviation Administration (FAA).

AIRCRAFT ENGINE PRODUCT SUPPORT

Although ASPR defines R&D, it does not define product support or discuss how it should be handled. Product support for military engines is defined in contract proposals and contractual documents for DOD programs. For example, Pratt & Whitney's proposals to the Navy define product support as effort directed toward maintaining specification performance and satisfactory service operation of aircraft engines. Product support includes (1) studies of design concepts and materials applications and (2) analysis, design, and testing of parts, components, and full-scale engines to

--correct problems encountered in operational use and in-house test programs;

--correct potential problems detected by engineering and laboratory examination of inservice engine parts;

--improve reliability, serviceability, and maintainability; and

--maintain a high flight safety level.

Similarly, General Electric AEG identified the following effort as an objective under a military engine component improvement program on an Air Force contract:

"Conduct engine and component test programs * * * to investigate and develop solutions for field service revealed engine problems * * *. Conduct accelerated service testing to identify problem areas and initiate corrective action in anticipation of potential field problems. Evaluate test results to validate design changes * * *."

As discussed in this report, product support is technical effort to bring inservice products up to existing specifications and to solve operating problems of inservice products.

WHO PAYS FOR PRODUCT SUPPORT

Product support for military aircraft engines begins when an engine has passed the model qualification test and has successfully demonstrated initial production suitability. DOD generally awards large annual level of effort contracts for such work. For example, DOD's product support costs at Pratt & Whitney, excluding fee, ranged from $41.5 million in 1968 to $20.5 million in 1974, and averaged $31.6 million annually for the 7 years.

The costs of commercial product support are usually paid for with company funds. For commercial aircraft engines, the Air Force and the Navy consider that product support begins when the FAA certifies the engines for commercial use.

Of the four contractors included in our review, Boeing and McDonnell Douglas, did not charge commercial product support to IR&D. However, as discussed in the following chapter, Pratt & Whitney and General Electric AEG charged some product support costs for commercial engines to IR&D.

Chapter 2

IR&D PROGRAM CHARGED FOR THE PRODUCT SUPPORT OF COMMERCIAL ENGINES

By allowing commercial product support costs in independent research and development, the Department of Defense is paying for (1) the military product support it wants under direct contract and (2) a part of a contractor's commercial product support program through IR&D. Although the Armed Services Procurement Regulation is silent, statements of certain Air Force, Navy, and contractor officials and DOD's treatment of product support for military aircraft engines indicate that commercial product support costs should not be allowed as IR&D.

AIR FORCE AND NAVY POSITIONS

The Air Force is the contracting agency for IR&D at Boeing, McDonnell Douglas, and General Electric Aircraft Engine Group. In a July 1973 memorandum the Air Force stated the following, concerning product support of commercial engines:

--FAA certification appears to be a reasonable and definitive endpoint of the development of commercial turbine engines.

--Product support and warranty fixes on certified engines are not IR&D.

--Review of contractor data would permit the Government to identify and disallow any contractor IR&D effort directed toward (1) component improvement of certified commercial production engines and (2) all corrections of deficiencies of certified models.

The Navy is the contracting agency for IR&D at Pratt & Whitney. According to a Naval Material Command official responsible for negotiating IR&D allowances, correcting operational problems of commercial aircraft engines after the Federal Aviation Administration's certification is the contractor's responsibility and should not be charged to IR&D.

CONTRACTORS' POSITIONS AND COMMENTS ON THEM

Officials of the Boeing and McDonnell Douglas corporations stated that commercial product support is not done under IR&D. We confirmed that both companies were in fact financing such costs.

Pratt & Whitney's policy, as stated in its annual IR&D brochures (proposals), is that "Work performed subsequent to FAA certification is not eligible for support under IR&D, but is funded under the Company-sponsored Product Support Program." As shown below, however, Pratt & Whitney does not follow its policy and charges the product support of commercial engines to IR&D.

General Electric AEG's position is that all engine development and improvement costs except those associated with FAA certification and those covered by direct contract are allowable as IR&D. General Electric AEG stated that commercial warranty costs for parts replacement and repair are not charged to IR&D. However, General Electric AEG believes that purchase orders to deliver engines, including warranty provisions, do not constitute a contract or provide funding for the development or improvement of the engine. Accordingly, this contractor believes that the costs of redesigning components to correct problems noted in the commercial use of an engine may be charged to IR&D as improvements to existing products.

Although ASPR allows improvement to an existing product under IR&D, we believe a distinction should exist between fixing an item so that it operates satisfactorily and improving an item that already operates satisfactorily. The former, in our opinion, is product support and should not be allowable as IR&D. As shown on page 10, General Electric AEG charges some of these costs to IR&D.

PRATT & WHITNEY AIRCRAFT

Pratt & Whitney does not follow its policy of charging engineering support of FAA-certified commercial engines to the company-sponsored product support program. The company has used its IR&D program to solve inservice commercial engine problems and for other engineering efforts.

Product Support

From 1968 to 1975 Pratt & Whitney developed various models of its JT9D engine for the Boeing 747 and McDonnell Douglas DC-10 aircraft. The company charged IR&D with the costs of solving these engines' operational problems that occurred after FAA certification. We identified the following problems and related 1970 to 1974 costs.

JT9D Problems	Identified IR&D Costs (millions)
First stage turbine blade	$ 3.2
Burner	3.1
Stall	3.0
Diffuser Case	(a)
Other (including fuel pumps and high oil consumption)	2.7
Total	$12.0
Allocated to Government contracts	$ 3.0

Examples of specific problems follow.

A burner problem

During 1970 and 1971 Pratt & Whitney JT9D inservice engines experienced problems caused by poor burner temperature distribution. These problems were severe enough for FAA to require operators to conduct more frequent inspections.

Pratt & Whitney attempted to improve the temperature distribution by redesigning the burner and some engine parts. In March 1972 Pratt & Whitney offered to absorb part of the airlines' costs for parts and labor to incorporate the new burner. The company's JT9D project manager stated that the new burner was developed to correct a known service problem and to obtain FAA certification of an advanced model.

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a/The work authorization for redesigning the diffuser case authorized design effort for many jobs, none of which was specifically identified.

We identified about $1.9 million of 1970 and 1971 IR&D charges related to improvements of temperature distribution.

Diffuser case problem

The first of many failures of diffuser cases on JT9D inservice engines was reported in June 1970. It originated in a welded area which cracked. Because these failures could have a catastrophic impact on public safety, FAA issued an airworthiness directive in November 1971, requiring more frequent inspections of JT9D inservice engines. By December 27, 1971, 188 cases had cracked and 8 others had ruptured.

Pratt & Whitney told FAA the solution was to redesign the diffuser case. This was done under an IR&D engine development project. Pratt & Whitney offered to provide financial assistance to JT9D operators to incorporate the new diffuser case. The next engine model certified also used the redesigned case. The redesign costs could not be identified.

In its July 1976 reply to a draft of this report (see app. II), Pratt & Whitney again stated that, in accordance with its policy, improvements to correct problems with inservice engines were not charged to IR&D. Pratt & Whitney stated, however, that the examples cited above were undertaken to introduce corrections in engines still under development, rather than those in service.

Yet, during our review, we had requested an FAA aerospace engineer familiar with some JT9D problems and a Naval Air Systems Command official familiar with military product support programs to review some data which we believed showed that Pratt & Whitney was performing product support effort under its IR&D programs. We asked each to review different data.

The FAA engineer reviewed the first-stage turbine blade and burner data referred to on page 6. The identified charges to IR&D of this effort was about $6.3 million. The FAA engineer stated that, with one exception, the work authorized under IR&D was directly applicable to JT9D inservice problems and, in most cases, directly related to corrective actions taken by Pratt & Whitney. He based his opinion on the points in time when (1) problems occurred, (2) solutions were developed, and (3) corrective actions were taken. He identified only one IR&D authorization, costing about $36,000, that was not directed to solving an inservice engine problem.

We asked the Navy official whether the tasks stated in 23 Pratt & Whitney IR&D work authorizations classified as "other" on page 6 were the type which would be considered product support if they related to military engines. He said his review was cursory and without in-depth followup or investigation because of time constraints. Even so, he concluded that 11 authorizations would be considered product support for a military engine. The identified cost charged to IR&D for these 11 authorizations was about $400,000. We considered his comments on the other authorizations and made appropriate reductions in arriving at the $2.7 million shown on page 6.

Engineering assistance to production and service

Pratt & Whitney has defined engineering assistance to production and service (EAPS) to include services to

--define and solve chemical and metalurgical production problems,

--solve production and quality control problems, and

--reduce costs.

EAPS for military engines is included in the price of DOD production contracts. There are accounts for charging costs of commercial EAPS to be absorbed by the company, but indications are that Pratt & Whitney also charged some of this type of effort to IR&D.

We scanned the 1973 IR&D work authorizations and noted eleven authorizations totaling $127,000 for work on commercial engines which met Pratt & Whitney's definition of EAPS and were charged to IR&D.

During our review we asked a Naval Plant Representative Office engineer to review five authorizations totaling $63,500. He said that similar effort for military engines would have been charged to the military EAPS program. We believe that this $63,500 should have been charged to the commercial EAPS account.

In commenting on our draft report, Pratt & Whitney stated, "* * * we believe the report has unfairly ascribed, as the motive for the work, desire for a side benefit: reduced manufacturing costs for certified engine models."

Without trying to ascribe a motive for charging these costs to IR&D, we were trying to point out that, in our opinion, these costs should not have been charged to IR&D.

Other

Other questionable charges to IR&D by Pratt & Whitney include:

--The preparation of a commercial engine display for Pratt & Whitney customers (fabrication of wooden stand blocks, support frames, etc.).

--The evaluation of products to select an alternate vendor source, should the single source vendor go out of business.

These efforts appear to have no relationship to either research or development.

Charging of commercial product support costs as IR&D questioned by the Air Force

DOD evaluated the 1970 IR&D program and reported in April 1971 that Pratt & Whitney was using IR&D funds for operational problems of the JT9D commercial engine. Specifically DOD stated:

"* * * The 1970 funding for the JT9D under IR&D was estimated to be $39M, but due to problems occuring in 1970, $9M more JT9D funding was utilized for the JT9D than was planned. * * * Thus, the important role of IR&D funding is apparent in that it enabled Pratt & Whitney to react immediately to operational problems encountered, and keep the 747 airplane in service."

As a result of this report, an Air Force official wrote to the Navy in July 1971 questioning the use of IR&D to solve commercial engine problems. He said:

"* * * We question the rationale of fixing commercial operational problems with IR&D funding. * * * We feel that closer adherence to the intent of the IR&D Program is necessary * * *."

Because the Government funds product support and component improvement programs for military engines by contract, the Navy asked Pratt & Whitney in January 1972 if

it had a similar direct funding program in support of its commercial engines. Pratt & Whitney stated:

> "* * * engineering support of engine models after the point of qualification for military models and after FAA certification for commercial models is not charged to IR&D * * *."

In July 1975 the Naval Material Command official who made the inquiry and who was involved in negotiating Pratt & Whitney's IR&D agreements told us he interpreted this statement to mean that the contractor was bearing sole responsibility for costs incurred in solving operational problems after a commercial engine was certified and that such costs were not charged to IR&D.

GENERAL ELECTRIC AEG

General Electric AEG officials believe that design effort to correct inservice engine problems is a proper charge to IR&D because they consider such redesign work to be product improvement and not product support to maintain specification performance. We could not find out how much IR&D work was for product support of inservice commercial engines because costs related to many tasks were grouped together by type of effort. The following examples, however, show that some of this effort should not have been charged to IR&D.

Warranty type of effort

General Electric AEG issues service bulletins informing its customers of solutions to engine problems and suggesting hardware changes to maintain satisfactory engine performance. Many service bulletins state that the company will provide new parts without charge and pay for installing them. These provisions indicate the existence of product warranty arrangements. General Electric AEG officials stated that such allowances do not necessarily imply that the work is covered by warranties but refused to let us examine commercial warranty provisions.

In our opinion, issuing a service bulletin granting labor credit and/or material allowance to incorporate a design change, whether for warranty or goodwill, indicates that the engineering effort to solve the problem was required to maintain specification performance or satisfactory service operation and, therefore, is not properly chargeable to IR&D.

Through March 1975, General Electric AEG had issued 1,190 service bulletins for its commercial CF6 engines which are used primarily on Boeing 747 and McDonnell Douglas DC-10 aircraft. Of these, 196 involved warranty-type provisions and required redesign work to solve the problem. Under General Electric AEG policy, some of the effort for the 196 new designs could have been charged to IR&D. For example, IR&D projects supported the related design changes of 21 CF6 service bulletins involving warranty provisions issued in 1974. Corporate funds were also used to make 18 of these 21 changes, but General Electric AEG officials would not say how much.

We identified three examples of inservice engine problems which were solved, at least in part, using IR&D funds.

Problem area	Estimated IR&D costs
Pneumatic starter	$ 56,892
Turbine blade retainer	22,000
Translating cowl tee hinges	63,633
Total	$142,525

Of the above amount, about $73,000 was charged to DOD contracts.

Engine test project

General Electric AEG's IR&D program included a high bypass turbofan engine test project. Its objectives were to cause inservice type failures in the factory, introduce corrective designs in the test engine, and verify the validity of the new design. These objectives were accomplished by running accelerated cycles on a CF6 engine. Many new component redesigns--including the pneumatic starter, retainer, and tee hinges cited above--have been tested and verified under this project.

From 1972 through 1974 General Electric AEG charged to IR&D about $20.8 million for this project. About $10.8 million was allocated to Government contracts. Our limited test showed that this project was used in some instances to solve problems identified in the operation of its commercial engines. We could not determine the extent General Electric AEG used this project to support contractual agreements because neither we nor the Air Force have access to the contractors' commercial records.

Similar efforts for military engines, however, are done through Government contracts. For example, General Electric AEG's 1974 TF-39 1/ component improvement program proposal identified the following as one of the objectives.

> "Conduct engine and component test programs * * * to investigate and develop solutions for field service revealed engine problems * * * Conduct accelerated service testing to identify problem areas and initiate corrective action in anticipation of potential field problems. Evaluate test results to validate design changes * * *."

This objective appears identical to the CF6 IR&D test project's objective. TF-39 progress reports and IR&D project descriptions for the CF6 show specific examples of similarities between component improvement projects and IR&D projects. Two such examples, reported as work accomplished under both programs, are (1) developing an interim solution to prevent compressor rear frame flange cracking and (2) developing an improved turbine midframe liner. According to General Electric AEG, if a problem is common to both the TF-39 and CF6, part of the development costs to solve the problem may be charged to component improvement and part to IR&D.

Charging common engine product support partly to a DOD component improvement contract and partly to IR&D results in the Government not only paying for its own product support, but also for a portion of the commercial share. This practice is inequitable to the Government. It also departs from DOD's usual objective of sharing all common product support costs on a predetermined basis. In our opinion, the Air Force should have considered these factors in its component improvement and IR&D agreements with General Electric AEG.

In a July 1976 letter commenting on our draft report (see app. III), General Electric AEG stated that there were no commercial engines as we used the term, but rather engine technologies which were applicable and beneficial to engines in military and commercial use. The company further stated that the CF6-50/F103 engine used in the test project discussed above was used in the USAF E4 Advanced Airborne Command Post, as well as commercial aircraft. General Electric AEG concluded that this was

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1/The TF-39 engine, used in the C5A aircraft, is the military predecessor of the CF6 engine.

a classic example of an independent project which benefited both military and commercial engines.

We acknowledge that engines used in commercial and military applications can be similar and that technical efforts undertaken primarily to support one can benefit the other. However, we believe that because the military buys large amounts of product support through direct contracting it should not also pay for support of engines being used in commercial applications. We noted that as of June 30, 1976, 496 CF6-50 engines had been sold for commercial use, while only 19 had been sold for military use. We recognize that future benefits could accrue to military engines. Nevertheless, we believe that the bulk of the technological benefits from the test project has flowed to engines in commercial use.

DOD COMMENTS

In our draft report we suggested that the Secretary of Defense issue clarifying instructions, amending ASPR if necessary, to provide DOD personnel conducting IR&D negotiations and reviews with the necessary guidance to prevent commercial product support from being allowed as IR&D.

In August 1976 (see app. I), DOD responded that technical effort necessary to the operation of a business is given the generic name of IR&D, and includes post production technical assistance called product support that a manufacturer provides to its customers to insure the proper functioning of its products. According to DOD, product support is not effort required in the performance of a contract, but includes technical effort required

--to answer problems arising in operating the products initially,

--in operating the products in environments slightly different than originally intended, or

--in proving technical information useful to the smooth introduction of the products into the customers' activities.

In addition to providing these definitions, DOD concurred that ASPR should be revised to include appropriate definitions of product support and product improvement and stated that it would initiate a study to develop such improved definitions.

DOD, however, did not specifically comment on that aspect of product support which we addressed--the technical effort needed for solving operating problems of inservice commercial engines. In our opinion, such effort is a cost that should be borne entirely by commercial business and should not be charged to IR&D for allocation to all business, which includes Government contracts. We believe this is so whether the effort is done to satisfy a warranty arrangement between the seller and the buyer or whether the seller acts out of goodwill.

DOD also did not comment on the fact that such technical effort is being allowed as IR&D for allocation to all business although it is similar to the effort for which the military pays directly under product support and component improvement contracts.

In an earlier report 1/, we concluded that ASPR excludes from IR&D not only that technical effort explicitly required by the terms of a commercial contract, but also that effort implictly required to fulfill the purchaser's requirements under the terms of a contract. The Navy stated that such was the case, but only after ASPR was amended on January 1, 1972. Pratt & Whitney contended that any effort not specifically contracted for was allowable IR&D.

In our draft of this report we pointed out that Navy contractors were unwilling to certify that their IR&D programs did not contain technical effort implicitly required by the terms of a contract. According to the Navy IR&D negotiator, contractors believe that "implicitly" covers such a broad spectrum that almost any effort could be considered unallowable as IR&D. We suggested that the Secretary of Defense initiate action to revise ASPR to specifically state that technical effort implicitly required to meet the purchaser's requirements under the terms of a contract or production order is not allowable IR&D.

In commenting on this matter in July 1976, General Electric AEG stated that it was:

> "* * * aware of no legal support for the proposition expressed in the draft report that the ASPR

1/"Independent Research and Development Allocations Should Not Absorb Costs of Commercial Development Work," Department of Defense (PSAD-75-5, Dec. 10, 1974).

definition of IR&D precludes the charging of costs which are "implicitly" related to a contract. Unless the contract provides funding for, or at least requires within its scope of work the technical effort under consideration, the cost of that technical effort is properly chargeable to IR&D."

The company cited an Armed Services Board of Contract Appeals decision and a Court of Claims decision in support of its position. The Board's decision was discussed in detail in our December 1974 report. These cases indicate that in some respects the meaning of "sponsored" in the ASPR definition of IR&D is unclear, but do not support the allowability of commercial product support as IR&D.

DOD's response to the recommendation was that revising ASPR to include the concept that all work implicitly required by a contract should not be allowed as IR&D leaves a great deal of impreciseness in the definition. DOD believes that the results of the new ASPR study may provide a better definition that will not be subject to misinterpretation.

We do not agree with DOD that a definition which excludes from IR&D all work implicitly required by a contract will of necessity be imprecise. In our opinion, the point when research and development ceases to be independent can be determined based on specific events. For example, when a seller contracts to deliver an undeveloped item to a purchaser's requirement, generally the research and development becomes the seller's responsibility even if the contract does not provide specific or adequate funding, or explicitly require such effort in its scope of work.

We also suggested that the Secretary of Defense determine the extent that product support and other non-IR&D efforts were included in Pratt & Whitney's and General Electric AEG's IR&D programs and obtain price adjustments when appropriate.

DOD commented that it:

"* * * is of the opinion that the legal constraints, the ambiguities in the IR&D definition, the difficulties in obtaining substantiating documentation and the obvious difficulties in resolving technical issues of fact, impair the likelihood of successfully obtaining any significant price adjustment. Moreover, in the case of

Pratt & Whitney, the product support costs appear to be well within the amounts voluntarily spent by the contractor in excess of the established ceilings. Accordingly, at the present time, we do not consider retroactive price adjustment a viable course of action."

Pratt & Whitney also stated that the amount questioned fell within the amount it spent in excess of negotiated IR&D ceilings.

As cited in our prior report, we do not agree that price adjustments cannot be obtained because a contractor's IR&D costs exceed established IR&D ceilings by more than the questioned unallowable IR&D costs. This is because DOD contracts absorb questioned unallowable costs in the proportion of such costs to the total IR&D costs incurred each year, and because IR&D agreements do not specifically include or exclude proposed projects in setting the amount to be allocated to all contracts proportionately.

However, we agree with DOD's conclusion because, in the absence of an expressed ASPR or contractual prohibition against the inclusion of commercial product support costs in IR&D, or of prior notice to the contractors that such costs will be disallowed, there is little possibility of success in any effort to obtain an adjustment.

CONCLUSION

Air Force, Navy, Boeing, and McDonnell Douglas officials have stated that product support of inservice commercial products should not be charged to IR&D We found that Boeing and McDonnell Douglas do not charge such costs to IR&D, although Pratt & Whitney and General Electric AEG do. Pratt & Whitney officials have stated that product support for inservice commercial engines is not charged to IR&D, but company records show otherwise. General Electric AEG believes product support design is allowable as IR&D.

The inadequacy of ASPR's definitions of IR&D allows for the inconsistent treatment of similar Government and commercial programs. In our opinion, the technical effort to solve problems of inservice commercial products is a cost that should be borne entirely by commercial business and should not be charged to IR&D for allocation to all business, which includes Government contracts.

We believe this is so whether the effort is done to satisfy a warranty arrangement between the seller and the buyer or whether the seller acts out of goodwill.

RECOMMENDATION

We recommend that the Secretary of Defense monitor the ASPR revision to make sure that the results provide contractor and Government personnel with a clear definition of IR&D that will specifically exclude

--commercial product support, and

--technical effort implicitly required to fulfill a purchaser's requirement under terms of a contract.

CHAPTER 3

PROBLEMS IN OBTAINING INFORMATION FROM CONTRACTORS AND WITH THE ADEQUACY OF THEIR RECORDS

To effectively review contractors' independent research and development programs, Government evaluators need an adequate definition of IR&D, adequate contractor records of IR&D transactions, and enough access to such records to determine if the definition is being followed. Our experience in two reviews of contractor IR&D programs has been that none of these conditions are present.

In chapter 2 we discussed the need to clarify the definition of IR&D as it relates to product support and for the assurance that implicit, as well as explicit, technical effort sponsored by or required in the performance of a contract is not allowed as IR&D. In this chapter we discuss the need to improve Government access to contractors' IR&D records and the condition of such records.

PROBLEMS IN OBTAINING INFORMATION AT CONTRACTOR PLANTS

The timely completion of our work at Pratt & Whitney was hampered by what we considered unreasonable delays in obtaining requested information or denials of information, and unresponsive replies which necessitated additional requests. The following average times elapsed between our requests and Pratt & Whitney's replies.

Number of requests	Type of reply	Average number of business days to respond (note a)
14	Responsive	33
9	Initially unresponsive	63
6	Denial	26

a/Some requests covered more than one subject. The number of days is based on the last date that data was received.

Pratt & Whitney officials denied six requests for information. For example, we requested reports which are distributed to Pratt & Whitney customers and which cite the history of JT9D engine problems and corrective actions. After 49 business days, Pratt & Whitney replied:

> "The JT9D Product Improvement Report is provided to all our commercial customers as part of our

practice in support of commercial engine operations. As you know, the GAO does not have a right of access to documents which pertain solely to our commercial programs. Therefore, your request for such access is respectfully denied."

General Electric Aircraft Engine Group officials refused to let us examine warranty provisions and other commercial records. While we recognize that the contractors were not obligated to furnish commercial business records, we believe that these documents could have greatly aided us in understanding the nature of the contractor work.

In commenting on our draft report, Pratt & Whitney stated that it had furnished us all information which we were legally entitled to. However, Pratt & Whitney had not furnished documents referred to in its IR&D work authorizations. We believe those documents are a part of the record of the Government-supported IR&D program and, as such, should have been made available to us.

INADEQUACY OF RECORDS FURNISHED

We experienced considerable difficulty in determining whether Pratt & Whitney and General Electric AEG included product support in IR&D because of the limitations of the records we were permitted to review. The companies' IR&D proposals and work authorizations generally identified broad areas of technical effort and did not identify whether individual projects were to solve operational problems. Large amounts of costs were charged to blanket work authorizations which did not disclose the details of the work accomplished. For example, Pratt & Whitney's 1973 JT9D project (a commercial engine) incurred $47.7 million, or about 38 percent, of the contractor's total annual IR&D costs. About 83 percent of this, or about $39.8 million, was charged to general work authorizations for

--engineering and technical support;

--assembly and test of experimental engines and rigs; and

--procurement of components, parts, and material for test engines and rigs.

Our findings were possible largely because we were able to relate FAA data on inservice engine problems to effort done as IR&D.

DIFFICULTY IN GETTING ACCESS TO COMMERCIAL RECORDS

In our December 1974 report on Pratt & Whitney's IR&D programs, we questioned the Department of Defense's accepting allocations of JT9D development costs from 1968 to 1973 because the technical effort was required to meet Pratt & Whitney's agreements with aircraft manufacturers. Pratt & Whitney had agreed to supply JT9D engines to the Boeing Company for its 747 aircraft and to the McDonnell Douglas Corporation for its DC10 aircraft.

During our prior review we were denied access to commercial records which would have established when an order or agreement occurred requiring development of engines. We recommended that DOD, to improve its administration of IR&D, expedite action under consideration to change ASPR to require that IR&D advance agreements specifically authorize access to contractors' commercial records for determining that IR&D costs were allowable.

In March 1975 DOD said that it had carefully considered the need for access in some cases to contractors' commercial records and instead was considering the feasibility of requiring contractors with whom advance IR&D agreements are negotiated to certify that costs incurred for IR&D projects sponsored by or required in the performance of a contract or other arrangement will not be allocated to DOD contracts.

The Navy had begun in 1974 to ask contractors to certify that their IR&D programs did not contain technical effort required in performance of a contract.

Pratt & Whitney certified that its 1974 IR&D program contained no technical effort required in performance of direct contracts. In reviewing Pratt & Whitney's 1974 and 1975 IR&D programs, the Navy was unable to obtain access to commercial records necessary to determine whether any effort was required by contract.

In June 1974 the Air Force issued a memorandum stating that the technical effort required in the performance of a direct contract is not allowable IR&D. Air Force System Command officials told us that a production (or purchase) order constituted a contract and that any technical effort to develop the product is not IR&D. They further believe that access to commercial records is necessary to determine if contractors use IR&D for work required in the performance of contracts and product support.

However, DOD's attempts to get contractors to certify that their IR&D programs meet the ASPR definition of IR&D have not been successful. Contractors are willing to certify that IR&D effort is not required in the performance of direct (explicit) contracts; however, they object to certifying that the effort is not implicitly required by contracts or production orders. DOD is unable to verify that explicit or implicit effort is not included in IR&D, because contractors will not permit access to commercial records.

DOD REVIEWS OF IR&D PROGRAMS

DOD reviews of IR&D brochures and work authorizations at Pratt & Whitney have not been concerned with identifying improper allocations.

DOD technical evaluators, plant representatives, and auditors make technical and cost reviews of IR&D programs. The purposes of technical reviews are to establish the reasonableness and technical quality of a proposed IR&D program and to determine, before and after performance, the potential military relevancy of its projects. The purposes of cost reviews are to (1) establish reasonableness of IR&D rates and levels of funding, (2) determine if the contractor has proper cost controls, and (3) insure that costs allocated to DOD contracts do not exceed the costs of IR&D projects determined to have potential military relevance.

Generally DOD's reviews did not address the question of whether the proposed or completed effort was commercial product support. In its advance review of Pratt & Whitney's 1975 IR&D program, the Defense Contract Audit Agency did try to determine if the proposal included any commercial product support. The agency's report stated this objective was not pursued because of a tight deadline and because the contractor considered the matter sensitive.

CONCLUSIONS

Unless transactions are better documented and the documents made available, DOD and other Government evaluators will have difficulty in determining whether a contractor includes commercial product support or other unallowance effort in its IR&D programs.

For reviews to be more effective, the specific work being done by contractors as IR&D must be made visible. DOD should require contractors to (1) clearly state in proposals and work authorizations why the work is being done and (2) associate

costs with specific efforts rather than with blanket work authorizations. DOD should also obtain enough access to contractors' commercial records to enable a determination that the costs charged to IR&D are for allowable efforts.

DOD COMMENTS

In the draft of this report we again suggested that the Secretary of Defense initiate action to revise ASPR to require that advance IR&D agreements contain specific authority for the Government to have enough access to contractors' commercial records to determine the allowability of IR&D costs. We also suggested that the Secretary require contractors to maintain better records and make them available to DOD personnel to determine whether IR&D funds have been spent only for authorized purposes.

DOD recognized the need for some type of assistance to the Government in determining that charges to IR&D do not include unallowable costs. However, DOD suggested an alternative to the concept of access to a contractor's commercial records.

DOD believes it is possible to develop a questionnaire which, when completed and certified to by contractors, would provide the data necessary for DOD to determine the allowability of IR&D costs, thus eliminating the need for full access audit and providing a basis for legal action in case of misrepresentation. DOD is proceeding with a project to define the types of information needed and to test the validity of such an approach.

DOD did not provide details of this test project for our evaluation. However, we believe that for the questionnaire approach to be effective it will still have to include provision for Government access to contractors' commercial records to allow for verification of certified data and to obtain specific pertinent data that on occasions may not be adequately covered in the questionnaire.

We do not intend that Defense should always examine contractors' commercial records or its authority should be without limitation. Instead, when analysis of available evidence raises questions, the authority should be available to permit examination to the extent necessary to determine the propriety of questionable IR&D charges.

DOD did not comment on the adequacy of contractors' IR&D records.

RECOMMENDATIONS

We recommend that the Secretary of Defense closely monitor the questionnaire test project to make sure that it will provide Government reviewers with the means of verifying the allowability of IR&D costs. Otherwise, ASPR should be revised to require that advance IR&D agreements contain specific authority for the Government to have enough access to contractors' commercial records to determine the allowability of IR&D costs.

We also recommend that the Secretary require contractors to maintain records in enough detail to enable Government evaluators to determine the allowability of charges to IR&D.

MATTERS FOR ATTENTION OF THE CONGRESS

The diligence with which DOD revises ASPR and formulates a questionnaire, and determines the results of these actions, should be of interest to the Appropriations and Armed Services Committees. The Senate Armed Services Committee, through its Research and Development Subcommittee, has followed closely DOD's implementation of its IR&D program under section 203 of Public Law 91-441. The Subcommittee chairman annually reports costs and program progress to the Senate. The Senate Committee on Appropriations was concerned over IR&D costs and directed DOD to submit an estimate of costs with its budget starting in fiscal year 1977. The requirement was concurred in by the conferees of both Houses.

Congressional hearings in September 1975 considered, among other aspects, the implications of a Government-wide policy on IR&D based on DOD's practices and procedures.

In pursuing their monitoring roles, the committees should note that some contractors have used IR&D programs for what we believe are questionable purposes and review DOD's efforts to tighten its guidance and obtain information from contractors' commercial business records. If these actions do not provide access that will permit reviewers to determine whether IR&D charges are allowable, legislative action by the Congress may be necessary.

APPENDIX I

DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING
WASHINGTON, D C 20301

13 AUG 1976

Mr. R. W. Gutmann
Director, Procurement and
Systems Acquisition Division
General Accounting Office
Washington, DC 20548

Dear Mr. Gutmann:

This is in reply to your letter of 28 May 1976 forwarding to the Secretary of Defense for comment a draft report entitled "Contractors' Cost for Support of Commercial Products Charged to Government Contracts" (Code 952082). The subject report deals with R&D type costs which GAO has labeled "product support" and recommends that DoD clarify the ASPR to prevent "commerical product support" from being included in IR&D. The report also recommends that the DoD recover from Pratt and Whitney and General Electric Aircraft Engine Group any "commercial product support" or "other non-IR&D" costs that DoD has reimbursed in the past.

It has been the policy of the Department of Defense to allow recovery, as an overhead charge, of reasonable amounts of technical effort necessary to the operation of the business. This effort has been given the generic name of IR&D and includes, by definition, that post-production, technical assistance called product support that any manufacturer provides to his customers to assure the proper functioning of his products in the hands of those customers. Also by definition, product support is not effort required in the performance of a contract but rather, among other things, is that technical effort required to answer problems arising in operating the products initially, in operating the products in environments slightly different than originally intended or in providing technical information useful to the smooth introduction of the products into the customers' activities. The key question, therefore, concerning the allowability of product support as IR&D is the question of whether the effort was specified as a deliverable requirement of an existing contract.

APPENDIX I

The DoD concurs that the definition of IR&D should be revised to include appropriate definitions of such terms as product support and product improvement. As a part of the effort to respond to this GAO study, DoD will initiate an ASPR case to develop such improved definitions.

DoD also recognizes the need for some type of assistance to the Government in determining that charges to IR&D do not include unallowable contract costs. In recognition of the problems associated with the concept of access to a contractor's commercial records, the Department believes that there is an alternative way that may prove to be more effective. We believe that it is possible to develop a questionnaire which contractors could submit in connection with their commercial work. The questionnaires would provide specific, certified pieces of data necessary for DoD to make determinations relative to allowability of costs. This would eliminate the full access audit in search of obscure bits of data and would provide a basis for legal action in case of misrepresentation. The Department is proceeding with a project to define the types of information which the DoD would need in such determination cases and to test the validity of such an approach.

The question of revising the ASPR to include the concept that all work implicitly required by a contract should not be allowed as IR&D leaves a great deal of impreciseness in the definition. The DoD believes that the results of the new ASPR case may well provide a better definition that will not be subject to misinterpretation.

The Department of Defense is of the opinion that the legal constraints, the ambiguities in the IR&D definition, the difficulties in obtaining substantiating documentation and the obvious difficulties in resolving technical issues of fact impair the likelihood of successfully obtaining any significant price adjustment. Moreover, in the case of Pratt and Whitney, the product support costs appear to be well within the amounts voluntarily spent by the contractor in excess of the established ceilings. Accordingly at the present time, we do not consider retroactive price adjustment a viable course of action.

Sincerely,

Malcolm R. Currie

APPENDIX II

PRATT & WHITNEY AIRCRAFT

Bruce N. Torell
President

July 26, 1976

Mr. R. W. Gutmann
Director
United States General Accounting Office
Procurement and Systems Acquisition Division
Washington, D. C. 20548

Dear Mr. Gutmann:

I appreciate the opportunity you have afforded me to comment on the Comptroller General's draft report, "Contractors' Costs for Support of Commercial Products Charged to Government Contracts".

The principle thrust of the report is that Pratt & Whitney Aircraft has charged Product Support activities for commercial engines to its Independent Research and Development Program, the cost of which is shared by the Government, in contravention of its own policy.

In my opinion, the accusation can be supported only by the very narrowest and self-serving, to the Government, interpretation of the facts.

It is, as stated in the report, Pratt & Whitney Aircraft's policy that Product Support for an engine which has been certificated by the Federal Aviation Administration, be funded under a company-sponsored program not chargable to IR&D. It is also true, as stated in the draft report, that the term "Product Support" is not defined in the Armed Services Procurement Regulation, nor is it defined in the law or in P&WA's and DOD's advance understanding covering IR&D and B&P costs.

It should be noted that the definition of IR&D contained in ASPR 15-205.35 defines "development" as:

> "The systematic use, under whatever name, of scientific and technical knowledge in the design, development, test, or evaluation of a potential new product or service (or of an improvement of an existing product or service) for the purpose of meeting specific performance requirements or objectives" (emphasis supplied).

APPENDIX II

We believe it is clear that if operation of one of our engines in the field indicates an area in which improvement can be made, the cost of developing such an improvement is allowable in IR&D under the terms of ASPR, and in accordance with our stated policy, unless, of course, such work is performed for the purpose of correcting engines in the field rather than to introduce corrections to new and as yet uncertificated models of the engines. The cases cited in the draft report do not fall within the exception in the preceding sentence.

Any IR&D program in our lines of business will necessarily draw heavily on service experience: that is how improvements come about. For example, our 1972 IR&D brochure stated, "In addition to increased thrust, the design objectives for the JT9D-23 include increased stability and durability." The JT9D-23 was at that time an uncertificated model of the JT9D engine. Obviously, this work could result in improved stability and durability in existing engine models, but it was not required for those models. We do not believe that the fact that certificated models might benefit from such work justifies the draft report's position that cost of such work is not properly included in IR&D.

As a corollary to the argument discussed above, the draft report alleges that $126,000 in 11 internal work authorizations during 1973 should have been charged to Engineering Assistance to Production in Service (EAPS) rather than to IR&D on the theory that the internal work authorizations relate to improved manufacturing capability. Again, we believe the report has unfairly ascribed, as the motive for the work, desire for a side benefit: reduced manufacturing cost for certificated engine models.

See GAO note on page 28.

APPENDIX II

The other significant point in the draft report which bears comment is the matter of our delays in providing information to the General Accounting Office. Many of the GAO's questions were multiple.

The GAO has reported as "delay" the time between the date such questions were first asked and continuing to the date the last answer was received to the last version of any question in that group. We should note that we processed more than 7,000 internal work authorizations to provide the information requested by the General Accounting Office, and that the only information we have not provided is that information to which the GAO is not legally entitled.

In conclusion, I think the reader of the report should be aware that the company's share of IR&D and B&P expenditures is substantially higher than the split between military and commercial sales would indicate it should be. This results because we have found it necessary, in every year since we negotiated our first IR&D Agreement with the DOD, to spend substantially more than the negotiated ceiling. As you know, the Government bears none of the costs above that ceiling. Even if all questioned costs set forth in the draft report were transferred to company accounts, our total IR&D and B&P cost would still exceed the negotiated ceiling and the Government would thus realize no recovery. The following table illustrates this point:

($ in 000's)	Total Actual	Ceiling	Amount Recovered From DOD	Percent Recovered From DOD	Percent Mil. of Total Sales
1972	$105,078	$ 69,000	$29,018	27.6%	40.1%
1973	140,212	69,000	26,863	19.2%	35.6%
1974	135,181	73,400	26,258	19.4%	32.7%
	$380,471	$211,400	$82,139	-	
Average	$126,824	$ 70,466	$27,380	21.6%	35.8%

Again, may I express my appreciation for the opportunity you have afforded me to comment on the draft report. I should appreciate your including a copy of this letter in any publications of the report.

Very truly yours,

B. N. Torell

BNT:mat

GAO note: Material eliminated relates to matters which are not dealt with in this report.

APPENDIX III

GENERAL ELECTRIC
COMPANY
1000 WESTERN AVE. LYNN, MASSACHUSETTS 01910

EDWARD WOLL
VICE PRESIDENT AND GENERAL MANAGER
GROUP ENGINEERING DIVISION
AIRCRAFT ENGINE GROUP

July 23, 1976

Mr. R. W. Gutmann, Director
Procurement and Systems Acquisition Division
United States General Accounting Office
Washington, D. C. 20548

Dear Mr. Gutmann:

We appreciate the opportunity you have afforded us to comment on the General Accounting Office's draft report on "Contractors' Costs for Support of Commercial Products Charged to Government Contracts" dated May 1976.

Unfortunately, the report appears to be premised on two very fundamental misconceptions. The first is a misinterpretation of the definition of independent research and development (IR&D) contained in ASPR 15-205.35. The second is reflected in the title of the draft report itself, i.e., the unwarranted assumption by your office that there are commercial engines, the technology of which is separate and distinct from that of military engines.

There are, in addition, other errors, some of which will be addressed below; but since these first two permeate the entire report, the bulk of my comments will be directed to those two subjects.

As you know, ASPR defines IR&D as that technical effort which is "not sponsored by or required in performance of a contract, grant ...." The draft report takes the position that technical effort which has, as its objective, bringing in-service products up to existing specifications or solving operational problems of in-service products is in the nature of a warranty effort and is, therefore, not properly allowable as an IR&D cost. In addition, the report states that technical effort required to further develop a product is not an allowable IR&D cost after the receipt of a purchase order for future delivery of the product.

We believe that neither position is correct and that both result from the same misinterpretation of the ASPR definition of IR&D.

The relevant definition was changed, effective January 1972, to add "or required in performance of" to the then existing definition which was limited to technical effort "not sponsored by a contract." The meaning of "not sponsored by" had been expressly addressed by the Armed Services Board of Contract Appeals (ASBCA) in 1966 in

APPENDIX III

General Dynamics Corporation, ASBCA No. 10254, 66-1 BCA paragraph 5680. There, the Board approved charging IR&D for the excess cost of projects undertaken on its own initiative by the contractor to the extent that those costs exceeded funding provided by public utilities and other organizations. That decision is a clear statement that technical effort which is not funded by or paid for under a particular contract is "not sponsored by" that contract. That principle was reaffirmed by the Court of Claims in Singer-General Precision, Inc. v. U.S., 192 Ct. Cl. 435, 427 F.2d 1187 (1970)

In addition, our review of the ASPR history leaves no doubt that the change which added "or required in performance of" into the definition of IR&D was not intended to modify the concept that costs which were not intended to be paid for or funded under a contract should be allowed as IR&D costs. To the contrary, the purpose in making the change was stated to be the avoidance of cost migration between IR&D and B&P and other technical effort.

We are, therefore, aware of no legal support for the proposition expressed in the draft report that the ASPR definition of IR&D precludes the charging of costs which are "implicitly" related to a contract. Unless the contract provides funding for, or at least requires within its scope of work the technical effort under consideration, the cost of that technical effort is properly chargeable to IR&D. This is true even where the contract assumes that the fruits of the IR&D effort will be incorporated in the equipment delivered.

As you may know, GE-AEG warrants hardware but does not warrant design. The limit of the company's warranty obligation is the replacement or repair of parts which fail to satisfy the warranty. We never have and do not now purport to charge IR&D with those warranty costs. However, modifying the design of existing equipment to improve the performance level or to increase the life or for any other technological benefit is not a warranty cost.

We believe that your selection of an aircraft engine manufacturer for the type of analysis undertaken in the draft report is particularly inappropriate. The report repeatedly refers to "commercial" engines. Yet, in truth, there are no "commercial" engines in the sense in which the term is used in the report. There are, rather, engine technologies which are equally applicable and beneficial to engines used in commercial applications and to those used in military applications. The best example of the report's misconception of this basic fact is its criticism of a high bypass turbofan engine test project under which $20.8 million was charged to IR&D for the years 1972 - 1974. The report labels this project "commercial product support" and defines the slave engine used in the program as the CF6. In fact, the engine used is the CF6/F103 which powers the USAF E4 ADVANCED AIRBORNE COMMAND POST and is either being tested or is the candidate engine for several other major Air Force projects. The statement in the report, therefore, that the project was "commercial product support" is completely erroneous.

In addition, it should be noted that this is an extremely important project aimed at improving the technology of life prediction and extension of engine designs and of lower cost accelerated testing with benefits to be applied to future engine design and development for both commercial and military applications. As such, the project is directly responsive to the government's encouragement of finding ways to reduce life cycle costs. It is, we believe, a classic example of a project independantly conceived by GE-AEG with substantial mutual benefit to engines used both in military and commercial applications.

The report's assumption that because a version of the CF6 engine was involved in this engine test project, it must, of necessity, be commercial product support is illustrative of a basic problem present throughout the report. The fact that a technical problem first surfaces in an engine used in a commercial application in no way means that it is a commercial engine problem. Almost invariably for each engine in commercial use, there is a companion engine virtually identical in its technology, which is used in military applications. However, engines in commercial applications receive many times more concentrated usage than do engines used in military applications. Therefore, it is to be expected that problems will first surface in the commercial applications. However, the solution to those problems unquestionably has equal relevance to the military application of that same engine. Therefore, it is not accurate to refer to such effort as commercial product support or even commercial product improvement.

We believe the tests to be applied in determining whether costs are properly recoverable as IR&D are as follows:

1. Is the effort independent?

2. Does it have military relevance?

3. Does the total amount of IR&D allocated to DOD contracts not exceed the total expenditures for IR&D projects with potential relationship to a military function or operation?

As explained above, under a proper interpretation of the ASPR definition of IR&D, technical effort to improve design which is not paid for or funded under a contract is properly "independent." Further, it has never been even suggested that the technical effort undertaken at GE-AEG and discussed in the draft report does not have military relevance. We believe, therefore, that the technical efforts questioned in the draft report were properly charged to IR&D.

See GAO note on page 32.

APPENDIX III

In conclusion, we recommend that prior to its issuance in final form, the subject report be corrected to reflect our comments.

We appreciate being afforded the opportunity again to submit our comments.

Sincerely yours,

Edward Woll

/frg

GAO note: Material eliminated relates to matters which were presented in the draft report but which have been revised or omitted from the final report.

APPENDIX IV

PRINCIPAL OFFICIALS

RESPONSIBLE FOR ADMINISTERING

ACTIVITIES DISCUSSED IN THIS REPORT

	Tenure of office	
	From	To
DEPARTMENT OF DEFENSE		
SECRETARY OF DEFENSE:		
Donald H. Rumsfeld	Nov. 1975	Jan. 1977
James R. Schlesinger	July 1973	Nov. 1975
Elliot L. Richardson	Jan. 1973	May 1973
Melvin R. Laird	Jan. 1969	Jan. 1973
DEPUTY SECRETARY OF DEFENSE:		
William P. Clements, Jr.	Jan. 1973	Jan. 1977
Kenneth Rush	Feb. 1972	Jan. 1973
Vacant	Jan. 1972	Feb. 1972
David Packard	Jan. 1969	Dec. 1971
DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING:		
Malcolm R. Currie	June 1973	Jan. 1977
Dr. John S. Foster, Jr.	Oct. 1965	June 1973
ASSISTANT SECRETARY OF DEFENSE (INSTALLATIONS AND LOGISTICS):		
Frank A. Shrontz	Mar. 1976	Jan. 1977
John J. Bennett (acting)	Mar. 1975	Mar. 1976
Arthur I. Mendolia	June 1973	Mar. 1975
Barry J. Shillito	Jan. 1969	Feb. 1973
DEPARTMENT OF THE NAVY		
SECRETARY OF THE NAVY:		
J. William Middendorf II	June 1974	Jan. 1977
John W. Warner	May 1972	May 1974
John H. Chafee	Jan. 1969	May 1972

	Tenure of office From	To
DEPARTMENT OF NAVY (cont'd)		
CHIEF OF NAVAL MATERIAL:		
Adm. Frederick H. Michaelis	Apr. 1975	Present
Adm. Isaac C. Kidd, Jr.	Dec. 1971	Apr. 1975
Adm. Jackson D. Arnold	July 1970	Dec. 1971
Adm. Ignatius J. Gallantin	May 1965	June 1970
DEPARTMENT OF THE AIR FORCE		
SECRETARY OF THE AIR FORCE:		
Thomas C. Reed	Dec. 1975	Jan. 1977
John L. McLucas	July 1973	Dec. 1975
Dr. Robert C. Seamans, Jr.	Feb. 1969	May 1973
COMMANDER, AIR FORCE SYSTEMS COMMAND:		
General William J. Evans	Sept. 1975	Present
General Samuel C. Phillips	Aug. 1973	Aug. 1975
General George S. Brown	Sept. 1970	July 1973
General James Ferguson	Sept. 1966	Aug. 1970